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EXAMINER

VAN, LUAN V

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1724

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

DETAILED ACTION

Response to Amendment

Applicant's amendment of October 14, 2010 does not render the application allowable. Claims 1, 2, 5-11, 15, and 17-23 are pending in the application. Claims 24 and 28-34 have been withdrawn. Claims 3, 4, 12-14, 16, 26, 27 and 35-53 have been canceled.

Status of Objections and Rejections

The rejection of claims 1, 2, 5-12, 14, 15, 17-23, 35-37, 39-45, 47-50, 52, and 53 are rejected under 35 U.S.C. 112, second paragraph, is withdrawn in view of Applicant's amendment. All other rejections from the previous office action are maintained.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1, 2, 5, 8-11, and 17-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hartmann et al. (US patent 5425862) in view of Lovejoy (US 4324633).

Regarding claim 1, Hartmann et al. teaches a device for electroplating a substrate, said device comprising: a) at least one arrangement, comprising at least one electrode (9-16, Fig. 1) for contacting the work pieces (1) and at least one electrolysis region in a respective one of which at least one counter electrode (24, 25) and the work

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pieces (1) are in contact with the processing liquid, characterized in that b) the at least one contacting electrode (9-16) is disposed outside of the at least one electrolysis region and is not in contact with the processing liquid, and c) the at least one contacting electrode (9-16) and the at least one electrolysis region are spaced so close together that small electrically conductive structures can electrolytically be treated, further characterized in that d) at least two contacting electrodes (9-16) are provided, at least one of them being disposed on one side of the electrolysis region and the at least other one on the other side of the electrolysis region (i.e., the electrodes 9-16 are provided on both sides of the electroplating chambers 6-8, see Fig. 1), and f) a cell wall exposed at the exit of an electrolysis region having an opening for the conveying path said opening having sealing members (22, 23) to prevent liquid escape with the workpiece passing by (Fig. 2). Further addressing claim 35, Hartmann et al. teaches a tampon of soft, open-pored plastic foam (column 4 lines 10-20) is positioned on both sides between the plastic film and a stationary part (i.e., anode). This reads on the isolation material of the instant claim.

Hartmann et al. differs from the instant claims in that the reference does not explicitly teach the spacing between the contacting electrode and electrolysis region being no more than a few centimeters apart or a contacting electrode rinsing facility.

However, Hartmann et al. teaches that the spacing between two bonding devices (i.e., electrodes) following one behind the other in the direction of movement of the plastic film should preferably not be too great, so that that voltage drops within the plastic film do not result in non-uniform electroplating (column 2 lines 58-63).

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Furthermore, the length of the individual electroplating chambers is governed by the permissible voltage drop within the plastic film (column 2 lines 66-68).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the spacing between the contacting electrode and electrolysis region and the length of the electrolysis region through routine experimentation in order to minimize the voltage drop within the substrate, as suggested by Hartmann et al. Furthermore, it is understood to one having ordinary skill in the art that when designing an apparatus, the size and relative proportion of the apparatus features can be selected to have the appropriate dimensions in order to accommodate the substrate to be treated. In *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), *cert. denied*, 469 U.S. 830, 225 USPQ 232 (1984), the Federal Circuit held that, where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device (MPEP 2144.04(IV)).

Lovejoy teaches an electrolytic apparatus for treating a continuous strip material comprising a rinse tank 12 (Fig. 4) housing a plurality of contact rollers 18 which establishes electrical connection with the strip as it travels through the tank (column 1 line 60 -- column 2 line 5). One or more spray nozzles are preferably mounted in the upper portion of the chamber for spraying water or a suitable rinse solution on the strip (column 3 lines 13-16).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have incorporated the rinse tank of Lovejoy for rinsing the contacting electrodes of Hartmann et al., because it would wash and clean the contacting electrodes from the electrolyte.

Regarding claim 2, Hartmann et al. teaches a tampon of soft, open-pored plastic foam (column 4 lines 10-20) is positioned on both sides between the plastic film and a stationary part (i.e., anode). This reads on the isolation material of the instant claim. Hartmann et al. does not explicitly teach whether the isolation material covers the entire length of the counter electrode. However, Hartmann et al. further teaches that this tampon lend the plastic film a certain stability so that sporadic yielding or buckling out is made more difficult (column 4 lines 15-20). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the size of the tampon of Hartmann et al. to cover the entire length of the counter electrode, because it would further increase the stability of the substrate within the electrolytic chamber, thus minimizing sporadic yielding or buckling (column 4 lines 15-20 of Hartmann et al.).

Regarding claim 5, Hartmann et al. teaches that the device comprises at least one processing module (6-8, Fig. 1) containing the processing liquid and the at least one counter electrode (24), the work pieces (1) being conveyed there through in a horizontal direction of transport, the at least one processing module (6-8) comprising, on the entrance and on the exit side thereof respectively, at least one passage for the work

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pieces (1) to enter and to exit said module and the at least one contacting electrode (9-16) being disposed on the passages.

Regarding claim 8, Hartmann et al. teaches partition members (20, 22) which comprise passages and sealing members (20, 22) for passage of the work pieces (1), the partition members being disposed between the at least one contacting electrode (9-16) and the processing liquid, said sealing members (20, 22) being disposed in such a manner that processing liquid can be prevented from coming into contact with the at least one contacting electrode (9-16).

Regarding claim 9, Hartmann et al. teaches that the sealing members are selected from the group comprising squeezing rollers (column 9 line 52).

Regarding claims 10 and 21, Hartmann et al. teaches the apparatus as described above. Hartmann et al. differs from the instant claims in that the reference does not explicitly teach whether the contacting electrodes are secured to the partition wall or the electrodes are disposed on a common carrier frame. However, since Hartmann et al. teaches that the contacting electrodes are positioned outside of the electroplating chamber, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have secured the electrodes on any walls outside of the plating chamber in order to prevent the plating solution from contacting the electrodes. Furthermore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have disposed the contacting electrodes and counter electrodes on a common carrier frame in order to facilitate construction of the apparatus.

Regarding claim 11, Hartmann et al. teaches roller contacts (column 3 lines 33-35).

Regarding claim 12, it is noted that the instant claim is directed to the relative dimensions of the apparatus and the structures on the substrate. Hartmann et al. does not explicitly teach the specific size of the structure to be electroplated. However, it is understood to one having ordinary skill in the art that the size of the apparatus can be designed or scaled to treat a structure having the desired size. Furthermore, Hartmann et al. teaches that the spacing between two bonding devices (i.e., electrodes) following one behind the other in the direction of movement of the plastic film should preferably not be too great, so that that voltage drops within the plastic film do not result in non-uniform electroplating (column 2 lines 58-63). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have scaled the size of the apparatus such that the structures of 2 cm can be electroplated in order to minimize the voltage drop within the substrate, as suggested by Hartmann et al.

Regarding claim 14, since the plastic foam has open pores (column 4 lines 10-20), it is ion-permeable.

Regarding claim 17, Hartmann et al. teaches that the electrodes are elongated and are oriented substantially parallel to the conveying path (Fig. 1).

Regarding claim 18, Hartmann et al. teaches that the contacting electrodes are cathodically polarized since the substrate is being electroplated.

Regarding claim 19, the anode of Hartmann et al. is insoluble since it does not dissolve.

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Regarding claim 20, the anode of Hartmann et al. is a flood anode since it has holes for allowing a passage of the plating solution.

Regarding claims 22 and 23, Hartmann et al. teaches a first and second storage facility 2 and 4.

Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hartmann et al. in view of Lovejoy, and further in view of Hirt et al. (US patent 4282073).

Hartmann et al. teaches the apparatus as described above. Hartmann et al. differs from the instant claims in that the reference does not explicitly teach whether the conveying path leads into the surface of the processing liquid. It appears that the instant claims are directed to vertically immersing the substrate into the processing liquid in a plating tank.

Hirt et al. teaches an apparatus for continuously electroplating a strip substrate in a plurality of plating tanks wherein the substrate is vertically immersed into the plating tank.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the apparatus of Hartmann et al. using the conveying path of Hirt et al., because it would enable the continuous plating of a strip substrate.

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hartmann et al. in view of Lovejoy, and further in view of Avellone (US patent 4401523).

Hartmann et al. teaches the apparatus as described above.

Hartmann et al. differs from the instant claims in that the reference does not explicitly teach whether the conveying path is inclined. Avellone teaches electroplating apparatus for plating a metallic strip wherein the strip path is inclined to the horizontal. This improves the plating uniformity and performance (column 11 lines 1-6). It would have been obvious to one having ordinary skill in the art at the time the invention was made to have provided the inclined conveying path of Avellone in the apparatus of Hartmann et al., because it would improve the plating uniformity and performance (column 11 lines 1-6 of Avellone).

Response to Arguments

Applicant's arguments filed have been fully considered but they are not persuasive. In the arguments presented on page 10-11 of the amendment, the applicant argues that Lovejoy does not teach a contacting electrode rinsing facility since Lovejoy teaches that the spray nozzles are used for rinsing the strip. This argument is deemed to be unpersuasive, because the spray nozzles of Lovejoy are structurally capable of rinsing either the strip or the contact rollers 18 (Fig. 4) since the spray nozzles are mounted in the upper portion of the chamber housing the contact rollers 18. The instant claim recites the rinsing facility in terms of its function, i.e., for washing the contact electrode, however, while features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from

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the prior art in terms of structure rather than function. *In re Schreiber*, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997), MPEP 2114. Furthermore, a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987). Since spray nozzles of Lovejoy are capable of rinsing the contact rollers, the apparatus of Lovejoy reads on the rinsing facility of claim 1.

The applicant further argues that contacting electrodes are not susceptible to corrosion since they are typically made of titanium. Even assuming the applicant's statement is correct, it is well known to one having ordinary skill in the art to use spray nozzles, as taught by Lovejoy, for cleaning and rinsing electroplating components that come into contact with the electrolyte whether it is to prevent corrosion or to simply clean and remove the electrolyte from the components.

The applicant further argues that Lovejoy uses the spray nozzles inside the rinse tank and not outside and that it would not be obvious to combine the spray nozzles of Lovejoy to rinse the bonding devices of Hartmann. This argument is deemed to be unpersuasive, because the instant claim does not require whether the rinsing facility is inside or outside of the rinse tank. Even assuming that the claim recites such limitation, it would have been obvious to one having ordinary skill in the art to position the spray nozzles in any desired position in order to spray a rinse solution on the desired components of the electroplating apparatus.

Conclusion

THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LUAN V. VAN whose telephone number is (571)272-8521. The examiner can normally be reached on M-F 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/Luan V Van/
Examiner, Art Unit 1724
November 8, 2010